INDOOR AIR QUALITY ASSESSMENT

Executive Office of Health and Human Services
243 Cottage Street
Springfield, MA

Prepared by:
Massachusetts Department of Public Health
Bureau of Environmental Health
Indoor Air Quality Program
August 2019

Background

Building:	Executive Office of Health and Human Services Center (EOHHS)
Address:	243 Cottage Street, Springfield, MA
Assessment Requested by:	Asya Rozental, Capital and Strategic Planning Manager, EOHHS Facilities
Reason for Request:	Reports of building occupant illness and concerns about general indoor air quality (IAQ)
Date of Assessment:	June 7, 2019
Massachusetts Department of Public Health/Bureau of Environmental Health (MDPH/BEH) Staff Conducting Assessment:	Michael Feeney, Director, IAQ Program
Building Description:	One-story, converted factory building
Building Population:	Approximately 100+ employees
Windows:	Not openable

Methods

Please refer to the IAQ Manual for methods, sampling procedures, and interpretation of results (MDPH, 2015).

IAQ Testing Results

The following is a summary of indoor air testing results (Table 1).

- ***Carbon dioxide levels*** were above the MDPH guideline of 1800 parts per million (ppm) in most areas assessed, indicating less than adequate fresh air in the space. However, note that most readings were only slightly above 800 ppm.
- ***Temperature*** was within the recommended range of 70°F to 78°F in all areas assessed.
- ***Relative humidity*** was within the recommended range of 40% to 60% in all areas assessed.
- ***Carbon monoxide*** levels were non-detectable in all indoor areas assessed.

- ***Fine particulate matter (PM2.5)*** concentrations measured were below the National Ambient Air Quality Standard (NAAQS) level of 35 μg/m^3 in all areas assessed.

Ventilation

A heating, ventilating, and air conditioning (HVAC) system has several functions. First, it provides heating and, if equipped, cooling. Second, it is a source of fresh air. Finally, an HVAC system will dilute and remove normally occurring indoor environmental pollutants by not only introducing fresh air, but also filtering the airstream and ejecting stale air to the outdoors via exhaust ventilation. Even if an HVAC system is operating as designed, point sources of respiratory irritation may exist and affect symptoms in sensitive individuals. The following analysis examines and identifies components of the HVAC system and likely sources of respiratory irritant/allergen exposure due to water damage, aerosolized dust, and/or chemicals found in the indoor environment.

Fresh air is introduced by rooftop air-handling unit (AHU) and distributed through ducted, ceiling vents throughout the building. The assessment results indicate that the ventilation system was limiting the amount of fresh air. The HVAC system is controlled by thermostats with a fan switch with two settings: "on" and "auto". When the fan is set to "on", the system provides a continuous source of air circulation and filtration. The automatic ("auto") setting on the thermostat activates the HVAC system only when temperature needs adjustment to meet the pre-set temperature. Once the pre-set temperature is reached, the HVAC system is deactivated and no mechanical ventilation is provided until the thermostat re-activates the system. At the time of assessment, all thermostat fan settings were in the "auto" position. The MDPH typically recommends that thermostats be set to the fan "on" setting during occupied hours to provide continuous air circulation. The fan "auto" setting can lead to IAQ/comfort complaints due to lack of air exchange.

Microbial/Moisture Concerns

A water-damaged ceiling tile was noted in one area of the building. Plants were observed in office areas (Picture 3). Plants can be a source of pollen and mold, which can be respiratory irritants to some individuals. Plants should be properly maintained and equipped with drip pans

to prevent water damage to porous materials. Plants should also be located away from air diffusers to prevent the aerosolization of dirt, pollen, and mold.

Water dispensers were observed in carpeted areas. These appliances may spill or leak and lead to carpet damage and microbial growth. It is recommended that these appliances be located in areas without carpeting or on waterproof mats. Carpet squares could also be replaced with tile in areas where water dispensers and refrigerators are located.

Other IAQ Evaluations

Exposure to low levels of total volatile organic compounds (TVOCs) may produce eye, nose, throat, and/or respiratory irritation in some sensitive individuals. To determine if VOCs were present, BEH/IAQ staff examined rooms for products containing VOCs and noted hand sanitizers, cleaners, and dry erase materials in use within the building. All of these products have the potential to be irritants to the eyes, nose, throat, and respiratory system of sensitive individuals. Photocopiers were also located next to occupied cubes; when heavily used, photocopiers can emit ozone, which is a respiratory irritant, and may also emit particulates and odors.

The offices were carpeted. Carpets should be cleaned annually (or semi-annually in soiled/high traffic areas) in accordance with Institute of Inspection, Cleaning and Restoration Certification (IICRC) recommendations, (IICRC, 2012).

Personal fans were observed in a number of areas. Fan blades to some of these units had settled dust, which can be reaerosolized when the fan is activated.

Conclusions/Recommendations

Based on observations at the time of assessment, the following is recommended:

1. Increase fresh air supply.
2. Operate supply and exhaust ventilation continuously in all areas during occupied periods.
3. Have the HVAC system balanced every 5 years in accordance with SMACNA recommendations (SMACNA, 1994).

4. Keep indoor plants in good condition, avoid overwatering, and avoid placing them on porous items such as carpets or paper. Also, keep plants out of the air stream of supply vents.
5. Replace water-damaged ceiling tiles.
6. Consider locating refrigerators and water dispensers in non-carpeted areas or place on a waterproof mat.
7. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritations).
8. Minimize use of hand sanitizers and other products containing VOCs.
9. Clean carpeting in accordance with IICRC recommendations (IICRC, 2012).
10. Clean the blades of fans periodically to remove dust and debris.
11. Refer to resource manual and other related IAQ documents located on the MDPH's website for further building-wide evaluations and advice on maintaining public buildings. These documents are available at: http://mass.gov/dph/iaq.

References

IICRC. 2012. Institute of Inspection, Cleaning and Restoration Certification. Carpet Cleaning: FAQ.

MDPH. 2015. Massachusetts Department of Public Health. Indoor Air Quality Manual: Chapters I-III. Available at: http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/.

SMACNA. 1994. HVAC Systems Commissioning Manual. 1st ed. Sheet Metal and Air Conditioning Contractors' National Association, Inc., Chantilly, VA.